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Gegenbaur's Comparative Anatomy of Vertebrates.[1]— For some years past rumors of a revised edition of Gegenbaur's *Vergleichende Anatomie* have been circulated by the European book-dealers, and even after the appearance of the masterly works of Lang, and of Korschelt and Heider, of Wiedersheim and of Hertwig, it must be confessed that the older text-book, if rewritten in the broad philosophical spirit that Gegenbaur accords to all his work, would have been no mean rival to the best that we have. Wisely or unwisely, Gegenbaur has not chosen to undertake the whole of this task, but has limited himself to a revision and expansion of only the vertebrate portion of his former text-book. The volume now published is about one-half of the new work, which even in its present state is more voluminous than the whole of the last edition of the *Comparative Anatomy*. The rest, we are told, is mostly written and may be expected within a year. When it is remembered that since the time of Owen no one perhaps has influenced the course of vertebrate comparative anatomy more profoundly than Gegenbaur, and that in the full strength of his years he now presents the results of a lifelong study, the monumental character of his work must be apparent.

The present volume contains nearly a thousand pages. After an introductory section the following systems of organs are treated: the integument, the skeleton, the muscular system, the nervous system, and the sense organs. The text is in two sizes of type, the smaller being reserved for less important topics. As a rule, most topics are followed by a brief list of the more important papers dealing with them. There is no index, but an extremely methodical arrangement and a detailed table of contents make this omission less noticeable. The text is illustrated by 619 figures, some of which are colored. The paper and presswork, while not the best, are uniformly good.

The new work is striking for the completeness with which the comparative method is applied. Thus, in the former editions, the integument of vertebrates was considered under three heads: the integument proper, epidermal structures, including glands, and the dermal skeleton. In Wiedersheim's *Lehrbuch*, which appeared some five years after Gegenbaur's last edition, a classification of the subject even to this slight extent was omitted, and the treatment of the integument lapsed into the purely descriptive form of a section on the integument of each group of vertebrates. In the new volume

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[1] Gegenbaur, C. *Vergleichende Anatomie der Wirbelthiere mit Berücksichtigung der Wirbellosen.* Erster Band. Leipzig, W. Engelmann (1898), xiv + 978 pp., 619 figs.

Gegenbaur builds on his former arrangement: under the head of integument we find chapters on the epidermis, the corium, and the pigment; under organ-formation of the integument are placed in sequence horny structures, skin glands, mammary organs, scales and feathers, and hair; finally there is a chapter on the dermal skeleton. While this classification may not be ideal, it has the great advantage of bringing together those organs which are most likely to form natural series. It is obviously much more in accord with the traditions of comparative anatomy to consider, for instance, integumentary glands under one head than to scatter them through a descriptive account of the integument of different groups of vertebrates. In this respect Gegenbaur has made a positive advance, and the shortcomings which his system may eventually show will doubtless be found to have been the result of what is at present undiscovered rather than of any lack of appreciation on the part of Gegenbaur as to what the comparative method implies.

The volume is so replete with material which, if not exactly new, is at least first brought together in compact form, that it is practically impossible to review it in detail. It is interesting, however, to observe the position assumed by Gegenbaur on several important questions with which he has been closely associated in the past. Thus, on the relation of the marsupium to the mammary pockets he maintains his original opinion that these organs are essentially distinct, although Klaatsch has recently shown that it is quite possible that the marsupium has arisen by a fusion of mammary pockets. On the question of the origin of the lateral appendages Gegenbaur stoutly defends his original contention that these parts probably represent modified gill-arches, his general argument being that it is safer to assume that the lateral appendages have come from gill-arches about which we know something than it is to suppose them derived from a continuous lateral fin about which we know little or nothing. In matters of theory the volume is strikingly conservative, and this conservatism is in some respects an advantage. Thus, in the treatment of the cranial nerves the parts are fully and well described, but the account is not concluded with a tabulation in which some more or less imaginary segmental value is assigned to each nerve. In this respect Gegenbaur's treatment of the subject seems to us wisely out of style.

It would deservedly be a thankless task to point out the small inaccuracies which this, like all other books, contains. The omission of a pisiform bone from the carpus of the snapping turtle (p. 529), and the description of the membrana tectoria as a cuticular structure (p. 890), may be contrary to fact, but they are blemishes which disappear in the marvelous wealth of accurate information which fills the whole work.

The place that the new *Anatomy* will find is not difficult to predict. Its size and fullness, together with the heaviness of Gegenbaur's style, will probably prevent it from being a popular text-book with most beginners, but its masterly qualities will make it an absolute necessity to every advanced student of vertebrate anatomy. In this respect it will occupy the field formerly held by Wiedersheim's *Lehrbuch*, though it seems to us unlikely that it will replace in any extensive way this author's *Grundriss*, which from its elementary character and simple language makes so satisfactory a book for the beginner.

The heavy debt which vertebrate anatomists already owe to Gegenbaur is materially increased by this accession to the list of best text-books, and it must be the wish of every one that circumstances may favor the early completion of a work destined to be so scholarly and valuable a contribution to the comparative anatomy of the vertebrates.

G. H. P.

The Natural History and Morphology of Dero vaga.[1] — This interesting little aquatic worm was described twenty years ago by Dr. Joseph Leidy[2] in this journal as *Aulophorus vagus*. It is found in shady places among vegetation in ponds and ditches, living by preference among masses of floating Lemna or among algæ on the bottom, shifting its position gradually from surface to bottom or *vice versa*, according to the location of food supply. Its food consists of vegetable matter, principally desmids, algæ, and even the fronds of Lemna. The worms inhabit cases which they construct of statoblasts, Arcella shells, the leaves of Lemna, etc. The cases of individuals living at the surface float, and those of individuals living at the bottom sink when the worms are removed. The period of sexual reproduction occurs during the first two weeks of July, when the body cavity posterior to the clitellum is crowded with eggs. Asexual reproduction by fission takes place throughout the year, but most rapidly during warm weather, when it may occur as often as

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[1] Brode, H. S. A Contribution to the Morphology of Dero vaga, *Journ. of Morph.*, vol. xiv (1898), pp. 141–180, Pls. XIII–XVI.

[2] Leidy, J. Notice of Some Aquatic Worms of the Family Naids, *Am. Nat.*, vol. xiv (1880), pp. 421–425.